TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
R-8767

In Re Application Of: Sean R. WAKAYAMA

Serial No.	Filing Date	Examiner	Group Art Unit
08/917,480	August 26, 1997	T. Dihn	3641

Invention: **RECONFIGURATION CONTROL SYSTEM FOR AN AIRCRAFT WING**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is: **$320.00**

☐ A check in the amount of the fee is enclosed.

☒ The Commissioner has already been authorized to charge fees in this application to a Deposit Account. A duplicate copy of this sheet is enclosed.

☐ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No.
A duplicate copy of this sheet is enclosed.

Signature

Dated: **December 19, 2002**

Raymond H. J. Powell, Jr.
Registration No. 34,231
WESTERLUND · POWELL, P.C.
100 Daingerfield Rd., Suite 100
Alexandria, Virginia 22314-2886
Ph: (703) 706-5862 - Fax: (703) 706-5860

I certify that this document and fee is being deposited on with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

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#35

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	
SEAN R. WAKAYAMA	Atty. Docket No.: R-8767
Serial No.: 08/917,480	Group Art Unit: 3641
Filed: August 26, 1997	Examiner: Dinh, T.
Title: **RECONFIGURATION CONTROL SYSTEM FOR AN AIRCRAFT WING**	

APPELLANT'S BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Hon. Assistant Commissioner
for Patents
Washington, D.C. 20231

Sir:

Appellant, within a six (6) month period from the mailing date of the Notice of Appeal (i.e., June 19, 2002), and further to the concurrently filed"Petition for Extension of Time of Four Months" attached hereto, herewith files an "Appeal Brief" drafted in accordance with the provisions of 37 C.F.R. § 1.192(a), as follows:

I. REAL PARTY IN INTEREST

The above-captioned application is assigned, in its entirety, to McDonnell Douglas Corporation, a company organized under the laws of the State of Maryland.

II. RELATED APPEALS AND INTERFERENCES

Appellant states that, upon information and belief, he is not aware of any co-pending appeal or interference which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-20 are pending. Claims 1, 6, 11, 16, and 19 were amended in a Preliminary Amendment filed on August 8, 2001. No claims were either cancelled or amended in the Request for Reconsideration filed on January 24, 2002, in response to a First Office Action dated October 24, 2001. Thus, claims 1-20 are on appeal and all rejections concerning claims 1-20 are herein being appealed.

IV. STATUS OF AMENDMENTS

The Preliminary Amendment filed on August 8, 2001, has been entered; no other Amendments have been proposed.

V. SUMMARY OF THE INVENTION

The present invention is directed to a system to reconfigure each of the deflectable control surfaces located on the trailing edge of an aircraft wing (e.g., the wing of a blended wing-body aircraft) to a predetermined position that optimizes the spanwise force distribution across the wing for each of a plurality of different flight conditions. See page 1, lines 11-15. Unlike the previously available technology, the optimal position of each deflectable control surface is pre-calculated for each of a plurality of different flight conditions, and when a particular one of the plurality of flight conditions is encountered, each of the control surfaces is reconfigured to this pre-calculated (i.e., predetermined) optimal position for that particular flight condition. See the paragraph bridging pages 3 and 4.

The operation of the present invention can best be understood by considering the various figures and the corresponding description in the specification. For example, Fig. 1 illustrates a conventional aircraft 20, which includes tubular fuselage 21, wing 23, horizontal stabilizer 25, and vertical stabilizer 27. When loaded, aircraft 20 has center of

gravity 29. Horizontal stabilizer 25 controls the rotation of aircraft 20 about the pitch axis passing through center of gravity 29. Vertical stabilizer 27 controls the rotation of aircraft 20 about the vertical, or "yaw," axis passing through center of gravity 29. See page 6, lines 15-20.

In Fig. 1, the vector L represents the lift generated by wing 23 while the vector I represents the lift generated by horizontal stabilizer 25, which is adjusted as necessary to stabilize the pitch moments of the aircraft. The presence of horizontal stabilizer 25 and vertical stabilizer 27 contributes a significant component to the total drag coefficient for aircraft 20. See page 6, line 22, through page 7, line 5. The design of aircraft 20 dictates that the wings 23 sustain large bending moments, i.e., the wings experience large bending moments because a substantial portion of the weight of the aircraft is located in the fuselage while the majority of lift generated by the aircraft is located on the wings. Wing 23 must, therefore, be designed to withstand the bending moment induced by the difference in centers of lift and weight, in addition to the forces and moments created by aircraft maneuvers. See page 7, lines 14-20.

As discussed with respect to Fig. 2, the drawbacks inherent to conventional aircraft 20 designs have led aeronautical engineers to consider tailless aircraft 30 designs, which include deflectable reflexes 33, deflectable control surfaces 35, and trailing edge 37. Fig. 2 also depicts a center of gravity 38, and center of pressure line 39. Reflexes 33 and control surfaces 35 are located in the trailing edge 37, with reflexes 33 being the most outboard of the deflectable control surfaces. Line 39 is the locus of the centers of pressure for the respective chordwise cross sections taken along the span of aircraft 30. See page 8, lines 1-8. It will be appreciated that the flight of aircraft 30 is controlled and stabilized by the deflections of both control surfaces 35 and reflexes 33. Upward deflection of the control surfaces 35 moves the center of pressure for the entire wing forward, generating pitching

moments that rotate the nose of the aircraft 30 in an upwardly direction, while downward deflection moves the center of pressure for the entire wing in an aft direction, generating pitching moments that rotate the nose of the aircraft in a downwardly direction. The steady-state angle-of-attack resulting from deflection of the control surfaces 35 depends upon the stability of the aircraft 30. See page 8, lines 10-21.

Although aircraft 30 provides significant advantages over aircraft 20, aircraft 30 still suffers from at least one major shortcoming, i.e., the pitch moment arm from center of gravity 38 to the lift vector l generated by reflexes 33 is shorter than the corresponding pitch moment arm for aircraft 20 between center-of-gravity 29 and the negative lift 1 generated by horizontal stabilizer 25. Thus, aircraft 30 is more sensitive to changes in the longitudinal station of center-of-gravity 38. See page 10, lines 3-14.

Fig. 3 is a perspective view of blended wing-body aircraft 41, which incorporates a control surface reconfiguration system 43 of the present invention. See page 10, lines 16-17. Moreover, Fig. 4 is a perspective view of the half of aircraft 41 located on one side of longitudinal axis of symmetry 45. Aircraft 41 includes six deflectable control surfaces: 47, 49, 51, 53, 55, and 57, which control surfaces are independently deflectable, and are located on the trailing edge of aircraft 41. See page 11, lines 3-9. An optimum reconfiguration of control surfaces 47, 49, 51, 53, 55 and 57 has been calculated for each of four flight conditions: (a) cruise; (b) forward and (c) aft center of gravity pitch maneuvers; and (d) maximum lift at low speed. See page 11, lines 11-14.

Specific flight conditions include, but are not limited to, cruise, pitch maneuver, and low speed (e.g., takeoff and landing). The optimum spanwise force distribution across the wing is different for each of these different flight conditions, and thus, the optimal position of each control surface is different for each of these different flight conditions. See page

4, line 7, through page 5, line 6.

With respect to the cruise flight condition, the control surfaces are preferably reconfigured to achieve a spanwise lift distribution that optimizes the lift-to-drag ratio while maintaining the aircraft at a trimmed angle-of-attack. Only minimal deflections of the control surfaces are necessary because the wing's baseline design is for optimal performance for the cruise condition. See Page 11, lines 16-21.

In a pitch maneuver, the control surfaces are deflected to pitch the nose up or down, which increases loading on the wing frame. As such, the control surfaces are preferably reconfigured, in a pitch maneuver flight condition, to achieve a spanwise lift distribution across the wing that minimizes the increased bending moments (about the bending axis) that necessarily results from increased loading on the wing. Minimizing the bending moments is desirable because increased bending moments require stronger aircraft structures, which means larger and heavier aircraft structures. This desired minimization of bending moments is preferably achieved by deflecting the control surfaces to predetermined positions which increase inboard lift in conjunction with decreased lift near the wing tips, and further, to provide the aircraft with additional pitch trim necessary for the pitch maneuver. See page 12, line 1, through page 13, line 4.

For low speed flight conditions such as take-off and landing, it is desirable to maximize lift while maintaining trim. As such, for this flight condition, the control surfaces are preferably reconfigured to maximize lift and delay stall while simultaneously trimming the aircraft. In the preferred embodiment, this is achieved by deflecting control surfaces in stall-critical locations downwardly, to thereby increase lift at these locations, and by deflecting control surfaces in non-stall-critical locations upwardly, to thereby trim the aircraft. See page 13, lines 7-15.

VI. ISSUES

1. Whether each of claims 6, 16, and 18 are indefinite under 35 U.S.C. §112, second paragraph, for lack of antecedent basis of the term "the bending moment with respect to a bend axis of the wing.

2. Whether each of claims 1-5, 7-15, 17, and 19-20 are unpatentable under 35 U.S.C. §103(a) as being obvious over Ashkenas (U.S. Patent No. 2,549,045) in view of Whitener (U.S. Patent No. 5,088,661).

3. Whether each of claims 1-5, 7-15, 17, and 19-20 are unpatentable under 35 U.S.C. §103(a) as being obvious over Ashkenas (U.S. Patent No. 2,549,045) in view of Whitener (U.S. Patent No. 5,088,661), and further in view of Lewis (U.S. Patent No. 4,796,192).

VII. GROUPING OF CLAIMS

Appellant hereby states that claims 1-20 stand or fall together.

VIII. ARGUMENTS

VIII. A. THE FINAL REJECTION

Final Office Action, (Paper No. 32), which was mailed April 2, 2002, states that:

1. Claims 6, 16, and 18[1] "are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention." More specifically, the Final Office Action alleges that claims reciting "the bending moment" lack antecedent basis.

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[1] Appellant respectfully submits that claim 18 does not recite "the bending moment" limitation attributed to the claim; thus, the rejection will be treated as if only claims 6 and 16 were rejected.

2. Claims 1-5, 7-15, 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ashkenas in view of Whitener. Ashkenas allegedly teaches a tailless aircraft with independently control surfaces located at stall-critical spanwise locations. The Final Office Action admits that Ashkenas is silent regarding a control surface configuration system in which the control surfaces are selectively reconfigurable to a plurality of predetermined positions as required to optimize the spanwise force distribution across the wing for each of a plurality of different flight configurations/conditions. Whitener is cites as clearly showing that a control surface configuration system in which the control surfaces are positioned at predetermined positions for certain flight configurations is well known in the art. Moreover, the Final Office Action alleges that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the control surface configuration system as taught by Whitener in Ashkenas' system to increase the maneuverability of the aircraft and to prevent detrimental effects on the aircraft.

3. Claims 6, 16, and 18 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Ashkenas as modified by Whitener as applied to claims 1 and 11 above, and further in view of Lewis (U.S. Patent No. 4,796,192). The Final Office Action alleges that the combination of Ashkenas and Whitener teaches all claimed parts of the invention but is silent on the use of the control flaps on reducing bending moment with respect to a bend axis of a wing. Lewis is cited as teaching that the use of control surfaces to reduce bending moments on the wing is well known in the art.

The instant appeal was taken based on claims 1-20 being twice rejected; there was not Advisory Action in this case.

VIII. B. The Cited Prior Art

ASHKENAS (U.S. Patent No. 2,549,045)

This reference discloses a means and method for controlling tip stall in airplanes having swept-back wing panels. In particular, Ashkenas provides a means and method of automatically opening normally closed tip slots as a stall condition is approached, preferably at predetermined values of lift coefficient of the wing tips. In lines 31-35 of Col. 2, Ashkenas states that "... trailing edge flap controls can be laid out to maintain their effectiveness at high angles of attack, and this effect can be efficiently utilized, such a flap layout, however, forming no part of the present invention."

WHITENER (U.S. Patent No. 5,088,661)

The Whitener reference teaches an aircraft having a flight control methodology characterized primarily by the following features:

1. the flight controls are active;
2. all flight control surfaces are primary;
3. the trailing edge of the aircraft wing is divided into a number of control surfaces (also referred to as control segments, elements, or members), and those control surfaces can be deflected or pivoted both downwardly and upwardly with respect to the aircraft wing;
4. the center of gravity of the aircraft is located well aft by conventional standards;
5. the aerodynamic control segments are operated in accord with a schedule in which the deflection of the several segments on each side of the aircraft body is individually controlled and effected; and
6. the aerodynamic control segments are operated via redundant, self-reprogramming computers.

LEWIS (U.S. Patent No. 4,796,192)

The Lewis reference teaches maneuvering load mitigation system permitting a maneuvering aircraft, which has a widely and rapidly varying wing root bending moment load in response to pilot command inputs and aircraft flight conditions, such as velocity, altitude and maneuver "g" level, to limit the bending moment. The bending moment is mitigated by commanding the outboard trailing edge flap on each wing. The maneuvering load alleviation system has no effect on the control surfaces or the operation of the aircraft when the wing root bending moment is below a threshold. Above the threshold, the system commands the trailing edge surface or outboard flap wing to maintain the root bending moment below the threshold value.

VIII.C. Claims 6, 16, and 18[2] Are Not Indefinite

The Final Office Action again rejects claims 6, 16, and 18 under 35 U.S.C. §112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Appellant regards as the invention. In particular, the Final Office Action alleges that the phrase "the bending moment" lacks antecedent basis. However, the Office Action has not demonstrated that the term "the" in the phrase "the bending moment" signals an attempt to establish antecedent basis. In the Final Office Action, the Examiner concludes that this rejection can be overcome by amending "the bending moment" to read "a bending moment." Appellant was aware of this "cure" to the alleged indefiniteness problem. However, since the solution is both grammatically incorrect and renders the rejected claims less clear, Appellant requests that the Board overturn the applied rejection under 35 U.S.C. §112, second paragraph.

With respect to claim 6 and 16, the Examiner has been repeatedly asked to reconsider his objection to the phrase "the bending moment with respect to a bend axis of

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[2] See Footnote 1.

the wing," used in claims 6 and 16 because the phrase is both grammatically and semantically correct. It will be appreciated that there is no possessive case for inanimate nouns in the English language. Appellant submits that, in English, the definite article "the" has uses other than referring to antecedents, the online version of the **Merriam-Webster's College Dictionary** (copy attached) being offered as evidence thereof. See definition **2.b (1)**, which indicates that the word "the" can be " used as a function word before a noun to limit its application to that specified by a succeeding element in the sentence," i.e., to denote that the "bending moment" references the phrase that follows, e.g., "with respect to a bend axis" in claim 6. Since Appellant has formulated the claim language in accordance with common and approved English usage, the Board is respectfully requested to reconsider and overturn the 35 U.S.C. § 112, 2nd paragraph rejection of claims 6 and 16.

Moreover, Appellant further submits that the only valid basis on which to object to lack of antecedent basis under 35 U.S.C. § 112, second paragraph, is where the claim becomes subject to dual and conflicting interpretation, which usually arises from double-inclusion problems.

In short, claims 1-20 have been carefully reviewed. It is respectfully submitted that claims 1-20 are both definite and entirely proper under 35 U.S.C. §112, since those of ordinary skill in the art can easily ascertain the metes and bounds of the present invention from the pending claims. The first sentence of the second paragraph of 35 U.S.C. §112 requires only that claims "set out and circumscribe a particular area with a reasonable degree of precision and particularity." In the absence of evidence to the contrary, what the claim defines is what the Appellant regards as his invention. If those skilled in the art can tell whether any particular embodiment is within the scope of a claim, the claim fulfills its purpose as a definition. See In re Miller, 169 U.S.P.Q. 597 (CCPA 1971). It is respectfully submitted that those skilled in the art would have no trouble determining the metes and

bounds of the invention from the pending claims.

VIII.D. Claims 1-5, 7-15, 17, and 19-20 Are Not Obvious Under 35 U.S.C. §103(a)

The final Office Action again rejects claims 1-5, 7-15, 17, and 19-20 under 35 U.S.C. §103(a) as being unpatentable over Ashkenas (U.S. Patent No. 42,549,045) in view of Whitener (U.S. Patent No. 5,088,661). The applied references are discussed immediately above.

It is well settled that 35 U.S.C. §103 authorizes a rejection where to meet the claim, it is necessary to modify a single reference or to combine it with one or more other references. After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why such proposed modification would have been obvious to one of ordinary skill in the art at the time the invention was made. See M.P.E.P. §706.02(j). In the discussion which follows, the specific requirements for establishing a prima facie case of obviousness will be signaled by the terminology Item (1), Item (2), etc.

It is respectfully submitted that the final rejection has again failed to comply with these minimum requirements. Appellant is left to guess which passages of the applied references are being relied upon in formulating the rejection. Moreover, Appellant can only speculate as to how the references are being combined and to what passage of which reference is being employed as supplying the motivation for the combination. For example, Appellant believes that the Final Office Action does address, i.e., suggest, replacement of

the control system taught by the Ashkenas with that taught by Whitener. However, the Final Office Action has expressly stated that the Examiner **is not suggesting a combination of these references**. As stated on page 4 of Paper No. 32,

> "The Examiner in no way intended to suggest that the control system of Whitener be used in the Ashkenas' reference. It is clear from the teaching of Whitener (see column 10, last paragraph to column 11, lines 29) that Ashkenas' aircraft control surfaces have predetermined positions so as to perform certain flight maneuvers/conditions with optimized spanwise force distribution across the wing."

Thus, the Final Office Action has failed to address Items (2) and (3), which are part of the minimum requirements for establishing a "prima facie" case of obviousness. The Appellant is left in the patently unfair position of rebutting the assertion that it would have been obvious to modify the Ashkenas system with the general knowledge of Whitener that suggests that something is possible since it may inherently produce results that are advantageous. This is not the fact based inquiry into obviousness dictated by 35 U.S.C. §103. In essence, the Office Action has stated that the Ashkenas and Whitener references exist and that these patents, in combination with a holding of "inherency' render independent claims 1, 11, and 19 obvious. However, that is not the criteria established by the U.S. Patent and Trademark Office and countenanced by the various courts in establishing that the claimed invention is obvious. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. See M.P.E.P. § 2143, citing In re Mills, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990).

Moreover, the fact that the teachings of the primary and secondary references cannot be combined as they teach away from one another is totally overlooked in the Final Office Action. In the Request for Reconsideration filed January 24, 2002, Appellant raised this issue with respect to conflicts between the primary and secondary references.

However, the Final Office Action failed to address the issue or even acknowledge that the issue exists. It is well settled that the test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art, and all teachings in the prior art must be considered to the extent that they are in analogous arts. Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. See M.P.E.P. § 2143, citing In re Young, 18 U.S.P.Q.2d 1089 (Fed. Cir. 1991).

It is respectfully submitted that the Office Action has not set forth a "prima facie" case of obviousness for all of the reasons discussed above and at least the following additional reasons:

First, the Final Office Action admits that the primary reference does not teach the recited control surface configuration system and relies on the secondary reference, in combination with inherency, to correct the deficiency in the primary reference. Stated another way, the combination of the primary and secondary references are admittedly deficient with respect to teaching "predetermined positions, which in combination, optimize the spanwise force distribution across the wing for each of the plurality of different flight conditions." The Final Office Action indicates only that "at a certain predetermined positions, it is *inherent* that spanwise force distribution across the wing is optimized since this would obviously optimize the maneuverability of the system." However, the Final Office Action fails to (1) address Appellant's previous assertion that the Doctrine of Inherency cannot be applied in a 35 U.S.C. §103 context or (2) demonstrate why this allegedly inherent feature is necessarily achieved. The Final Office Action merely concludes that when the control surfaces of the aircraft of Ashkenas are optimally set for a particular flight condition, that these surface while optimize spanwise force distribution across the wing.

More specifically, page 5 of the Final Office Action stated that:

> Thus, it is inherent that the spanwise force distribution across the wing is optimized since this would obviously optimize the maneuverability of the aircraft. In other words, if the aircraft wants to increase its lift by a desired amount, the control surfaces would be altered in a predetermined position (for a position that corresponds to the desired lift wanted), which will lead to an optimized spanwise force distribution across the wing for this desired flight profile (desired amount of lift). Other flight conditions such as low speed flight condition with increase local coefficient of lift and pitch trim are controlled by the control surfaces which would lead to an optimized spanwise force distribution across the wing so that the low speed flight condition can be achieved.

As Appellant has noted repeatedly, inherency is not an element of and can not be used to demonstrate obviousness. Thus, since the Final Office Action tacitly admits that the primary and secondary references do not teach "predetermined positions, which in combination, optimize the spanwise force distribution across the wing for each of the plurality of different flight conditions," and the Examiner cannot import the missing limitation into the combination using the Doctrine of Inherency, no possible combination of the applied references could render claims 1, 11, and 19 obvious.

The Final Office Action again seems to imply that at some predetermined (but undefined) position, it is inherent that the spanwise force distribution across the wing is optimized. Even assuming *arguendo* that this assessment is correct, which it is not, the combination would still fail to render the claimed invention obvious. However, there is simply no showing that such a result would ever occur. As discussed above, it is black letter law that obviousness cannot be established by inherency.

Secondly, it is respectfully submitted that the rejection set forth in the Office Action is based on a superficial understanding of the actual teachings of the primary and secondary references. For example, Ashkenas teaches a tail-less aircraft equipped with

slots 10 on the **leading edges** of each wing W, which are designed specifically to prevent wing tip stall. See column 3, lines 22-25. Column 5, lines 35-45, describe the automatic operation of the slots 10 at various lift coefficients at the wing tips. In contrast, Whitener teaches that the loads and bending moment imposed on the wing can be concentrated near the center of the wing. Thus, the combination of the primary and secondary references are in conflict, i.e, Whitener teaches away from Ashkenas. However, the test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art, and all teachings in the prior art must be considered to the extent that they are in analogous arts. Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. See M.P.E.P. § 2143, citing In re Young, 18 U.S.P.Q.2d 1089 (Fed. Cir. 1991).

Third, the references are not combinable, since their control surface and system teachings are in conflict. As mentioned in the Ashkenas patent, the center of gravity of the aircraft may be moved aft by the addition of a tail. However, since Ashkenas teaches a tail-less aircraft, the control system must accommodate an aircraft with a forward center of gravity. In contrast, Whitener teaches a control system for aircraft where the center of gravity is well aft of the wing. See column 3, lines 20-32. This section goes so far as to indicate that the control surface behave in a manner opposite to that of conventional control surfaces. Thus, even if the control system were moved from the secondary reference to the primary reference, the system could not be employed on the aircraft taught by the Ashkenas patent.

Fourth, and finally, the Whitener patent teaches away from the claimed invention. For example, the paragraph bridging columns 1 and 2 points out that:

> A related disadvantage is that the trailing edge control members of conventional aircraft are so designed and operated that large loads are imposed on the wing at significant distances from the aircraft body. These loads can cause unwanted wing bending; they can also make rapid pull-ups unsafe.

Thus, the Whitener patent teaches away from the very concept that for which the Office Action relies on the secondary reference. One of ordinary skill in the art, following the guidance Whitener, would be led in a direction divergent from the path that was taken by the Appellant because Whitener teaches away from the invention of claims 1, 11, and 19. Since a reference which teaches away is a significant factor in determining obviousness, the nature of that teaching is highly relevant and must be considered. See In re Gurley, 31 U.S.P.Q.2d 1130 (Fed. Cir. 1994).

Appellant respectfully submits that the Examiner's analysis gives no weight to the teachings in the secondary reference which contradicts the Examiner's position. This selective view of Whitener allows the Examiner to focus on the trailing and independently operated control surfaces while completely ignoring, for example, that Whitener teaches away from predetermined positions, which in combination, optimize the spanwise force distribution across the wing for each of the plurality of different flight conditions.

For all of the reasons numerated above, it is respectfully submitted that the Examiner has not set forth a prima facie case of obviousness. In particular, given that one of ordinary skill in the art would have recognized a fundamental conflict in the teachings of the applied references, a conflict not recognized, much less addressed, by the Final Office Action, that one would not have attempted to combine the primary and secondary references as suggested in the Office Action. In that the combination of references is improper, a prima facie case of obviousness cannot be established by the combination. In short, since (1) the applied references cannot be combined as suggested and (2) at least

two limitations of independent claims 1, 11, and 19 are completely absent in the proposed combination, it is respectfully submitted that no possible combination of the applied references could render the invention recited in claims 1-20 obvious. The Board is respectfully requested to overturn the 35 U.S.C. §103(a) rejection of independent claims 1, 11, and 19. Claims 2-5 and 7-10, depending from claim 1, claims 12-15 and 17, depending from claim 11, and claim 20, depending from claim 19, are allowable for all of the reasons given regrading the respective independent claims.

VIII.E Claims 6, 16, and 18 Are Not Obvious Under 35 U.S.C. §103(a)

The final Office Action rejects claims 6, 16, and 18[3] under 35 U.S.C. 103(a) as being unpatentable over Ashkenas as modified by Whitener as applied to claims 1 and 11 above, and further in view of Lewis, all of which are discussed above. This rejection is respectfully traversed, since the addition of Lewis does nothing to correct the deficiencies and conflicts associated with the primary and secondary references discussed immediately above. Thus, the combination of references including Lewis could not render the inventions of claims 1 and 11 obvious. Therefor, the same combination cannot possibly render dependent claims 6 and 16 obvious. The Board is respectfully requested to overturn the 35 U.S.C. §103(a) rejection of claims 6 and 16.

In summary, Appellant respectfully requests that the Board reverse the final rejection of all of the appealed claims, and to find each of the claims to be allowable for defining subject matter which is patentable over Ashkenas.

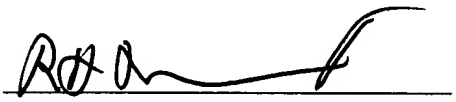
This Appeal Brief is submitted in triplicate, and authorization for payment of any underpayment of the required Brief fee or extension fees, or any other fees that may be required to maintain pendency of this application, by charging Deposit Account No. 16-

[3]/See Footnote 1.

2372, is hereby given.

Appellant will delay a final decision with respect to any request for an oral argument until after review of the Examiner's Answer.

Respectfully Submitted,



Raymond H. J. Powell, Jr.
Reg. No. 34,231

WESTERLUND · POWELL, P.C.
100 Daingerfield Rd., Suite 100
Alexandria, Virginia 22314-2886

Ph: (703) 706-5862 - Fax: (703) 706-5860

Attachments:

1. Appendix IX Containing Finally Rejected Claims Under Appeal Herein
2. Selected Pages of the Online Version of the Merriam-Webster's College Dictionary

NOTE: For the convenience of the Board, Appellant's Section IX. containing the claims on appeal is contained on a separate APPENDIX sheet following the below signatory portion of this Appeal Brief, to thereby enable the Board to detach this APPENDIX without disturbing the integrity of the remainder of this Appeal Brief.

Date: December 19, 2002 Attorney Docket No.: R-8767

IX. APPENDIX

1. A tailless aircraft, including:

a wing having a trailing edge and independently deflectable flight control surfaces located along the trailing edge, the wing being capable during flight of generating a normal lifting force having a spanwise force distribution across the wing; and

a control surface reconfiguration system wherein, for each of a plurality of different flight conditions, the flight control surfaces are selectively reconfigurable to respective predetermined positions, which in combination, optimize the spanwise force distribution across the wing for each of the plurality of different flight conditions including a low speed flight condition wherein first selected ones of the deflectable flight control surfaces located at stall-critical spanwise locations are positioned to increase a local coefficient of lift and other deflectable flight control surfaces are positioned to control pitch trim.

2. The aircraft as set forth in Claim 1, wherein:

the lifting force generates a moment acting on the wing; and

the control surface reconfiguration system also minimizes the moment for at least one of the different flight conditions.

3. The aircraft as set forth in Claim 2, wherein:

the control surface reconfiguration system minimizes the moment for structurally crucial flight conditions.

4. The aircraft as set forth in Claim 1, wherein the control surface reconfiguration system also trims the wing.

5. The aircraft as set forth in Claim 1, wherein:

one of the different flight conditions comprises cruise, with the wing having a lift-to-drag ratio during cruise; and

the control surface reconfiguration system functions to maximize the lift-to-drag ratio of the wing during the cruise flight condition.

6. The aircraft as set forth in Claim 1, wherein the plurality of flight conditions include a pitch maneuver wherein the deflectable flight control surfaces are positioned to minimize the bending moment with respect to a bend axis of the wing.

7. The aircraft as set forth in Claim 1, wherein:

one of the different flight conditions comprises a pitch maneuver; and,

the control surface reconfiguration system functions to achieve the required lifting force during the pitch maneuver flight condition.

8. The aircraft as set forth in Claim 7, wherein:

the aircraft has a longitudinal axis of symmetry; and,

the control surface reconfiguration system functions to shift the spanwise force distribution towards the longitudinal axis without reducing the lifting force, during the pitch maneuver flight condition.

9. The aircraft as set forth in Claim 1, wherein the aircraft is a blended wing-body aircraft.

10. The aircraft as set forth in Claim 1, wherein the different flight conditions include cruise, takeoff, and pitch maneuvers.

11. An aircraft, including:

a wing having a trailing edge and independently deflectable control surfaces located along the trailing edge, the wing being capable during flight of generating a normal lifting force having a spanwise force distribution across the wing; and

reconfiguration means for selectively reconfiguring the control surfaces to respective predetermined positions, which in combination, are effective to optimize the spanwise force distribution across the wing for each of a plurality of different flight conditions including a low speed flight condition wherein selected ones of the deflectable flight control surfaces located at stall-critical spanwise locations are positioned to increase a local coefficient of lift and other deflectable flight control surfaces are positioned to control pitch trim.

12. The aircraft as set forth in Claim 11, wherein:

the lifting force generates a moment acting on the wing; and

the reconfiguration means functions to minimize the moment for at least one of the different flight conditions.

13. The aircraft as set forth in Claim 11, wherein:

the control surface reconfiguration system minimizes the moment for structurally crucial

flight conditions.

14. The aircraft as set forth in Claim 11, wherein the reconfiguration means also trims the wing.

15. The aircraft as set forth in Claim 11, wherein:

one of the different flight conditions comprises cruise, with the wing having a lift-to-drag ratio during cruise; and

the reconfiguration means functions to maximize the lift-to-drag ratio of the wing during the cruise flight condition.

16. The aircraft as set forth in Claim 11, wherein the plurality of flight conditions include a pitch maneuver wherein the deflectable flight control surfaces are positioned to minimize the bending moment with respect to a bend axis of the wing.

17. The aircraft as set forth in Claim 11, wherein:

one of the different flight conditions comprises a pitch maneuver; and,

the reconfiguration means functions to achieve the required lifting force during the pitch maneuver flight condition.

18. The aircraft as set forth in Claim 17, wherein:

the aircraft is a blended wing-body with a longitudinal axis of symmetry; and,

during the pitch maneuver, the reconfiguration means functions to shift the spanwise

force distribution towards the longitudinal axis without reducing the lifting force.

19. A method for controlling flight of a blended wing-body, tailless aircraft which includes a wing having a trailing edge and independently deflectable flight control surfaces located along the trailing edge which are deflectable in upward and downward directions, the wing being capable during flight of generating a normal lifting force having a spanwise distribution across the wing, the method including the steps of:

predetermining for each of a plurality of different flight conditions the respective position for each of the flight control surfaces, which in combination, optimize the spanwise force distribution across the wing for each of said different flight conditions including a low speed flight condition wherein first selected ones of the deflectable flight control surfaces located at stall-critical spanwise locations are positioned to increase a local coefficient of lift and other deflectable flight control surfaces are positioned to control pitch trim;

subjecting said aircraft to at least one of said different flight control conditions; and

reconfiguring the control surfaces upwardly or downwardly to the respective predetermined positions when subjecting said aircraft to each of said at least one flight control conditions to optimize the spanwise force distribution across the wing.

20. The method as set forth in Claim 19, including the step of reconfiguring the control surfaces to control trim of the aircraft.

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the[1,definite article] Go

Main Entry: **1the**
Pronunciation: *before consonants usually* [th]&, *before vowels usually* [th]E, *esp Southern before vowels also* [th]&; *for emphasis before titles and names or to suggest uniqueness often* '[th]E
Function: *definite article*
Etymology: Middle English, from Old English *thE,* masc. demonstrative pronoun & definite article, alteration (influenced by oblique cases -- as *thæs,* genitive -- & neuter, *thæt*) of *sE;* akin to Greek *ho,* masculine demonstrative pronoun & definite article -- more at THAT
Date: before 12th century
1 a -- used as a function word to indicate that a following noun or noun equivalent is definite or has been previously specified by context or by circumstance <put *the* cat out> **b** -- used as a function word to indicate that a following noun or noun equivalent is a unique or a particular member of its class <*the* President> <*the* Lord> **c** -- used as a function word before nouns that designate natural phenomena or points of the compass <*the* night is cold> **d** -- used as a function word before a noun denoting time to indicate reference to what is present or immediate or is under consideration <in *the* future> **e** -- used as a function word before names of some parts of the body or of the clothing as an equivalent of a possessive adjective <how's *the* arm today> **f** -- used as a function word before the name of a branch of human endeavor or proficiency <*the* law> **g** -- used as a function word in prepositional phrases to indicate that the noun in the phrase serves as a basis for computation <sold by *the* dozen> **h** -- used as a function word before a proper name (as of a ship or a well-known building) <*the* Mayflower> **i** -- used as a function word before the plural form of a numeral that is a multiple of ten to denote a particular decade of a century or of a person's life <life in *the* twenties> **j** -- used as a function word before the name of a commodity or any familiar appurtenance of daily life to indicate reference to the individual thing, part, or supply thought of as at hand <talked on *the* telephone> **k** -- used as a function word to designate one of a class as the best, most typical, best known, or most worth singling out <this is *the* life> <*the* Pill> -- sometimes used before a personal name to denote the most prominent bearer of that name
2 a (1) -- used as a function word with a noun modified by an adjective or by an attributive noun to limit the application of the modified noun to that specified by the adjective or by the attributive noun <*the* right answer> <Peter *the* Great> (2) -- used as a function word before an absolute adjective or an ordinal number <nothing but *the* best> <due on *the* first> **b** (1) -- used as a function word before a noun to limit its application to that specified by a succeeding element in the

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sentence <*the* poet Wordsworth> <*the* days of our youth> <didn't have *the* time to write> (2) -- used as a function word after a person's name to indicate a characteristic trait or notorious activity specified by the succeeding noun <Jack *the* Ripper>
3 a -- used as a function word before a singular noun to indicate that the noun is to be understood generically <*the* dog is a domestic animal> **b** -- used as a function word before a singular substantivized adjective to indicate an abstract idea <an essay on *the* sublime>
4 -- used as a function word before a noun or a substantivized adjective to indicate reference to a group as a whole <*the* elite>

Pronunciation Symbols

\&\ as **a** and **u** in **abut**	\e\ as **e** in **bet**	\o\ as **aw** in **law**
\&\ as **e** in **kitten**	\E\ as **ea** in **easy**	\oi\ as **oy** in **boy**
\&r\ as **ur/er** in **further**	\g\ as **g** in **go**	\th\ as **th** in **thin**
\a\ as **a** in **ash**	\i\ as **i** in **hit**	\[th]\ as **th** in **the**
\A\ as **a** in **ace**	\I\ as **i** in **ice**	\ü\ as **oo** in **loot**
\ä\ as **o** in **mop**	\j\ as **j** in **job**	\u\ as **oo** in **foot**
\au\ as **ou** in **out**	\[ng]\ as **ng** in **sing**	\y\ as **y** in **yet**
\ch\ as **ch** in **chin**	\O\ as **o** in **go**	\zh\ as **si** in **vision**

For more information see the Guide To Pronunciation.